

19. Describe the function of series and shunt dynamos with its characteristics.
20. Establish Maxwell's electromagnetic equations.
-

NOVEMBER/DECEMBER 2025

**FEL21/CEL21 — ELECTROMAGNETISM
AND AC CIRCUITS**

Time : Three hours

Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. State Faraday's laws of induction.
2. Explain eddy current and its uses.
3. What is meant by impedance?
4. Define Q - factor.
5. What is Tesla coil?
6. Give the meaning of frequency of oscillation.
7. What is delta connection?
8. How a dynamo works?



9. State Gauss's law in electrostatics.
10. Write any two differential form of Maxwell's electromagnetic equation.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) Obtain the expression for coefficient of self induction of a solenoid.

Or

- (b) Derive the expression for coefficient of coupling.

12. (a) Get an expression for root means square value of alternating current.

Or

- (b) Explain Wattless current with a neat diagram.

13. (a) Explain the construction and working of transformers.

Or

- (b) Discuss the growth and decay of the alternating current in a circuit having L and R.

14. (a) Differentiate star and delta connections in an ac circuit.

Or

- (b) Briefly explain the working principle of DC motor.

15. (a) State and prove Ampere's circuital law.

Or

- (b) Explain the significance of $\nabla \cdot \mathbf{B} = 0$.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Describe a method of finding mutual inductance experimentally.
17. Derive the expression for virtual value of an alternating current.
18. An alternating current is flowing in a circuit having L, C and R connected in series. Discuss the necessary condition for resonance. Discuss the intensity of resonance.

